



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/849,460	05/04/2001	Teng-Tang Yang	JCLA6212	8342

7590

10/16/2003

J C Patents Inc  
4 Venture  
Suite 250  
Irvine, CA 92618

EXAMINER
----------

YEVSIKOV, VICTOR V

ART UNIT	PAPER NUMBER
----------	--------------

2825

DATE MAILED: 10/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/849,460

Applicant(s)

YANG ET AL. *pe*

Examiner

Victor V Yevsikov

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 10 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

#### Statutory Basis

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

#### The Rejections

Claims 1-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akram et al. in view of Tanabe et al. and Kwon et al.

Akram discloses a method of making a conductive structure via a photolithographic and etching steps as described in column 3, lines 40-60, (Claim 1) comprising: forming a substrate 38, a processed barrier layer 50a formed "on" the substrate, a pre in-situ metal layer 50b, and a first metal layer 50c which is formed after the pre in-situ layer and in the same vacuum. The barrier layer 50a and first metal layer 50c can be titanium nitride and tungsten, respectively. (claims 3 and 7, see lines 23-38 of column 4).

Further, the layer 50b is a mixture and can be TiN or TiW as detailed at the same location in column 4. (claim 2). As to the issue of processing, the Akram reference discloses from column 4, line 64 to column 5, line 28, the manner of forming the graded layers wherein they are formed in the same chamber without breaking vacuum. (Claim 1

Art Unit: 2825

and 4). For these reasons, the claimed subject matter is viewed as anticipated by Akram et al.

Akram teaches the above features but lacks an explicit disclosure of: processing the barrier layer in high temperature or cooling in the environment of formation; wherein the barrier layer can be composed of a plurality of metal layers and the explicit recitation of an antireflective material as element 53. The drawings of Akram depict only a single barrier layer 50a as opposed to a plurality of barrier layers; however, the passage in column 4, lines 11-38, details that the layer 50 can be composed of a plurality of layers and is not limited to 3. ("Layer 50 may be made of a number of discrete sub-layers.").

Consequently, this would suggest that an additional layer can be incorporated into the depicted drawings with the layer 50a and thus the barrier layer can be composed of multilayers, which satisfy the transition from TiN to W. (Claim 5).

Additionally, in the sputtering and CVD processes of formation, the device created is subjected to a cooling in the air when the gases are purged at the end of the sputtering or the CVD process is complete. By so doing, the operator would prevent unwanted contamination of further areas of the device when the wafer is moved to the next process chamber. (Claim 6).

Therefore, it would have been obvious to one of ordinary skill in the art to allow the wafer formed in the process as outlined in Akram to cool in the atmosphere until all the forming gases are purged so as to prevent the unwanted deposition of the material in other areas of the device.

Art Unit: 2825

Further, it would have been obvious to incorporate a plurality of layers for the barrier layer 50a as Akram suggests such as a means for supplying a good transition from the layer of 50a to the layer to 50c.

Akram discloses the features outlined above but as to claims 1 and 10, the layer 53 is indicated as a nitride and is an insulative layer. Therefore, the function of layer 53 is not specified and the type of nitride is not specified.

However, it is notoriously well known to one of ordinary skill in the art, of which the examiner takes Official Notice, to use nitrides such as titanium nitride and silicon nitride as anti-reflective materials whereby the photolithographic formation of the gate stack is improved or made with more precision. In support of this assertion, the examiner cites Tanabe and Kwon wherein in Tanabe, the layer 13 is a silicon nitride and is used as a means for improved precision in gate formation; and Kwon discloses that titanium nitride is a well known antireflective material.

Therefore, it would have been obvious to have the nitride layer 53 of Akram be titanium nitride and function as an antireflective material in order to provide a more precision defined gate structure.

### ***Status of the Remaining Claims***

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. This claim recite limitations as to a dielectric layer playing a role in the formation of the conductive structure which is not shown in the prior art.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-8 and 10 have been considered but they are not persuasive in view of combinations detailed above.

The combinations detail each and every element of applicant's claims or further show the invention of applicant's is an obvious development from the prior art.

### ***Conclusion***

#### ***Notice of Finality***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1. 136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1. 136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

#### **Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor Yevsikov whose telephone number is 703-3050129. The examiner can normally be reached on Monday-Thursdays 8:30-5:30.

Art Unit: 2825

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 703-308-1323. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-3081373.

Victor Yevsikov

October 3, 2003



MATTHEW SMITH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800